

Five Highs, Four Lows, and Three Optimizations: A Study on the Integrated Online and Offline Autonomous Learning Model

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Abstract: Given the "Five High" characteristics of online-offline integrated teaching, including high uncertainty in teaching mode, high complexity of teaching environment, high utilization of information technology, high requirements for students' self-discipline, and high expectations for teachers' teaching abilities, and given the "Four Low" challenges of low classroom attraction, low utilization rate of online course resources, low student participation and interest in learning, and low communication and interaction between teachers and students, we propose a project management approach to explore self-learning teaching methods. This approach aims to optimize three aspects: transforming teachers' classroom roles, efficiently implementing flipped classrooms, and reasonably assigning online and offline tasks. Ultimately, our goal is to achieve a deep integration of online and offline teaching and to cultivate students' ability for independent learning.

Keywords: Integrated teaching, project management, and self-directed learning

1. Introduction

In the current social environment, teachers are increasingly actively participating in the practice of integrating online and offline teaching. According to survey data, the majorities of teachers hold a positive attitude towards this integrated teaching method and are willing to explore more possibilities. This transformation in teaching mode has partially demolished the walls of the classroom, resulting in changes in teaching models, as well as in teacher-student relationships. While previous integrated teaching was primarily limited to experimental implementations on a small scale, the COVID-19 pandemic has necessitated widespread online education, establishing a new normalcy in education. As a result, we have seen the emergence of an entirely new teaching model—integrated online-offline teaching. This integrated approach brings both opportunities and challenges. As an apt Chinese idiom goes, "After this change, many dark horses will emerge, but some stars may also fall." This seemingly simple statement raises a crucial question: how can we cultivate students' self-discipline and independent learning abilities in this integrated teaching environment?

The national 14th Five-Year Plan clearly states that we must "improve the education system serving lifelong learning for all, expand resources for lifelong education through multiple channels, and better meet the diversified learning needs of different groups." The new "Vocational Education Law" also clearly conveys the concept of serving lifelong education for all, adhering to market-oriented principles, promoting employment, and being open to all individuals and aptitude-oriented education, serving lifelong learning for all and building a skilled society, continuously improving the social service level of vocational colleges and universities [1-2]. In the rapidly developing modern society, self-directed learning is an essential ability that each individual must possess. It is also the educational goal and standard for higher institutions to cultivate talents. Improving students' self-directed learning ability is not only an important means to achieve the goal of cultivating talents in vocational education, but also meets the needs of individuals to achieve lifelong learning and realize their personal values in the new social form [3].

2. The characteristics and issues of online-offline integrated teaching in higher vocational colleges

Although higher vocational colleges have made some achievements in exploring online-offline integrated teaching, there are still many problems that need to be further studied and addressed based on the characteristics of online-offline integrated teaching.

In the process of online-offline integrated teaching, there are five high characteristics, including high uncertainty in teaching mode, high complexity in teaching environment, high utilization of information technology, high requirements for students' self-discipline, and high requirements for teachers' teaching ability.

In the process of online teaching, due to the "five high" characteristics, it further leads to four low problems, including low classroom attraction, low utilization rate of online course resources, low student participation and interest in learning, and low communication between teachers and students. Some teaching work lacks sufficient pre-class research, fails to take employment as the guidance, is divorced from the needs of enterprise employment and regional economic development, and has outdated teaching models and materials as well as backward teaching methods and techniques; In the process of teaching, especially online teaching, students don't know what they are learning for, or some students have high theoretical level but weak hands-on ability, while enterprises urgently need compound talents with solid theoretical knowledge, strong operational ability, and good teamwork spirit; When teachers switch between online-offline courses in local and small-scale situations, there are outdated teaching and management methods, and online-offline teaching fails to switch and integrate well, resulting in a series of problems such as low classroom attraction, low utilization rate of online course resources, low student participation and interest in learning, and low communication between teachers and students.

3. The exploration of an integrated online and offline autonomous teaching model

How to improve the current teaching model and management methods to adapt to the integrated online and offline teaching format, cultivate autonomous learning abilities, and address the issues of "Five Highs" and "Four Low" is a topic that requires our consideration and research. As shown in Figure 1, based on the current situation, we have implemented three optimized initiatives during the integrated online and offline teaching process.

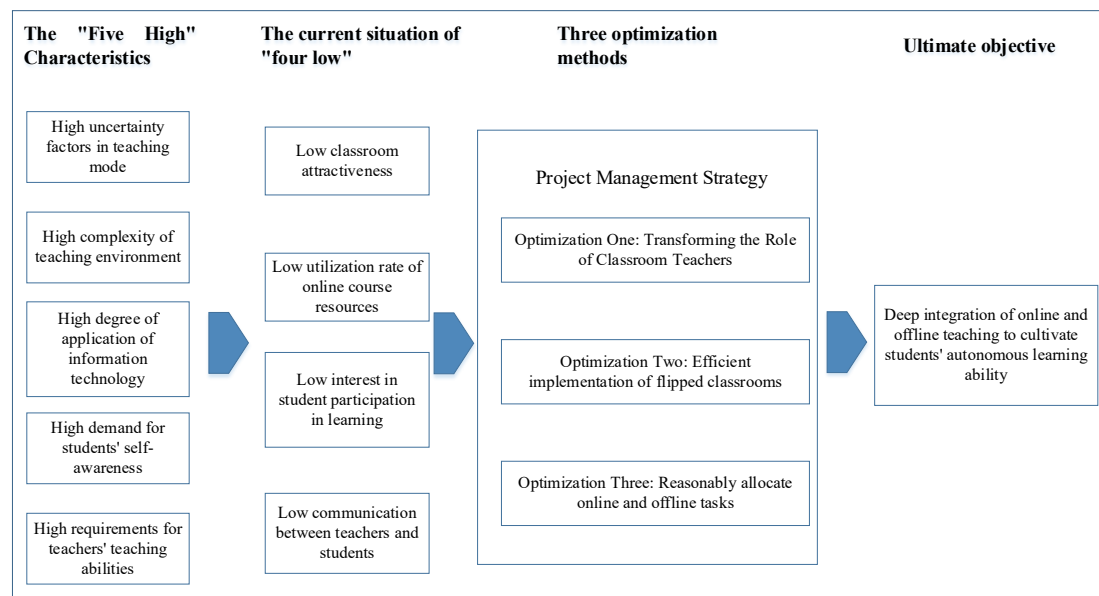


Fig.1 Main research ideas

To address the aforementioned issues, a comprehensive pre-class research was conducted, aimed at aligning course design with industry-led approaches and employer needs. In partnership with industry players and based on local economic requirements, we emphasized the importance of "high-quality" talent development. As shown in Figure 2, this was achieved by incorporating practical programming and demonstration elements into the curriculum design, which allowed students to apply theoretical

knowledge to real-world situations and vice versa. This approach facilitated a deeper understanding and retention of knowledge, while enhancing students' ability to solve practical problems using the skills gained from theory and practical experiences. Additionally, we aimed to integrate industry and education, actively exploring teaching reforms that aligned the supply-side of talent development with the demand-side of industry needs.



Fig.2 Programming and simulation display in course design

In addition, through the self-learning method of "project management strategy", taking production practice and life phenomena as the starting point and guided by the "work process", we analyze the corresponding professional knowledge in each case, form typical cases for repeated training, and comprehensively review the overall situation of the project. We promptly summarize experience, consider related knowledge points, and imperceptibly cultivate good self-learning and proactive cognitive habits^[4].

3.1 Implementation of Online and Offline Integrated Teaching with Three Optimizations

3.1.1 Transforming Teachers' Role in the Classroom

Teachers should take the initiative to change their role, from demanding and giving to encouraging and guiding, to promote students to establish learning groups^[5], achieving one-to-one assistance and good students helping out those who struggle. Groups are organized with discussions, practices, and mutual assistance sessions to enable students to gain self-growth and progress through active observation, independent thinking, and communication sharing. This effectively stimulates students' confidence in continuing their online learning.

3.1.2 Implement Flipped Classroom effectively

Integrate flipped classroom with personalized and differentiated teaching concepts to involve all students in the classroom, changing the traditional mode of knowledge transmission from a one-way to a shared mutual assistance teaching approach. Learning content is not limited to textbooks, but is based on tasks assigned by teachers or self-designed by students. By establishing efficient learning assistance groups, students' enthusiasm for learning is fully mobilized. Group members collaborate to complete tasks with clear divisions of labor. Through mutual assistance and discussion, teacher-student interaction is further enhanced, improving teaching effectiveness.

3.1.3 The online and offline tasks should be allocated in a reasonable way

The teacher should prepare the learning materials in advance and share them online, while the students should preview them in advance to save time for online learning and have more time and energy to consolidate, deepen, and generalize after class. In addition, we should focus on stimulating students' innovative spirit and logical analysis ability, encourage them to self-learn through the internet, and guide them to participate in discussion and evaluation. In offline learning, students should focus on cultivating their ability to analyze and solve problems, broaden their knowledge, deepen their innovative ability, and make them more suitable for the "self-learning before class to in-depth learning under teacher guidance in class" model.

3.2 Application strategy of project-based learning in teaching

3.2.1 The experiential teaching method that is oriented towards the "work process"

Project-based learning adopts a "work process" orientation, which means to let students learn by experiencing the actual work process of professionals in their respective fields through hands-on projects^[6]. This method allows students to gain a deeper understanding of the professional knowledge and skills they need to master through experiencing the entire project cycle from project selection to implementation and evaluation^[6]. In addition, it can also cultivate students' various abilities such as creative thinking, interpersonal communication, teamwork, and practical application, enabling them to develop a stronger interest and enthusiasm for their chosen fields while improving their professional literacy.

3.2.2 The student-led project-based teaching model

This approach to teaching, based on project-based learning, recognizes the central role of students in the classroom, who take charge of the project and direct it themselves. This approach not only ensures their leadership in the process but also encourages critical thinking, fosters intellectual exploration, and enhances their teamwork skills and personal development. This valuable experience is invaluable for vocational college students who are about to enter the workforce as it prepares them for real-world challenges^[4]. As shown in Figure 3, self-directed learning through project management can be implemented.

Based on the nature of the course and a set of predefined strategies, self-directed learners are divided into "temporary project groups". The principle of voluntary registration is applied, and the groupings are formed based on the course's requirements. Students' classroom performance, grades, and final exam results are taken into consideration when selecting project group leaders and recruiting team members. This approach aims to develop students' ability to collaborate, self-learn, and work in a structured environment. Through a tiered organizational structure, teachers can keep track of students' progress in real-time and provide personalized guidance to address specific issues related to the project.

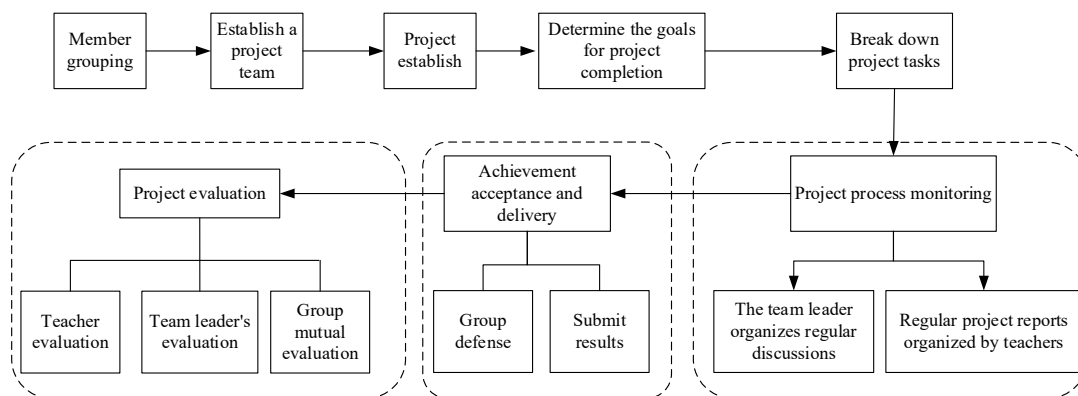


Fig.3 Autonomous Learning Process Based on Project Management

The project "project approval" was completed under the guidance of the teacher, and the learning objectives were established through feasibility analysis. With the teacher's guidance, the stages and overall goals were clarified, and the content that needs to be organized and summarized during the independent learning process was listed, such as papers, laboratory reports, system documentation, or instructions. When determining the learning objectives, the significance of the learning content was clarified, combined with the students' learning ability, expected time limit, content difficulty, and platform resources. Under the guidance of the teacher, the students analyzed the feasibility of the goal and completed its establishment.

Develop a project plan and set target milestones to increase students' motivation for learning. Each group should identify a series of smaller goals by breaking down the tasks into multiple stages, with each stage achieving an incremental goal. The benefit of this approach is that it encourages students to maintain their interest and motivation by completing smaller tasks and goals, while also allowing teachers to have better control over the progress of learning.

Complete the project task breakdown, assign each sub-task to the respective team members, and

specify the "4W1H". Each project team will break down the learning objectives into individual tasks, distribute them among all members, and specify the due date based on the task progress and difficulty. This ensures clear target achievement, accountability, and transparency. Each learner knows exactly what they need to do (What), why they are doing it (Why), when it needs to be completed (When), and how to accomplish it through research, consulting with teachers, group discussion, etc. This adheres to the "4W1H" principle of project management [3].

Project monitoring, where the group leader organizes regular team meetings and uploads progress reports, and the teacher conducts periodic project presentations. The group leader arranges regular meetings to discuss the learning progress, problems encountered, solutions, and experiences, which are then recorded as the basis for the final member grades and achievements. Periodically, the teacher organizes project presentations to understand the progress of students' self-learning, providing targeted guidance for any issues they cannot resolve.

Project deliverables (learning objectives and outcomes) acceptance and handover. At the end of the self-learning process, the project team is responsible for acceptance testing and delivery of the project deliverables. This involves checking whether the expected learning objectives have been met, conducting a group defense and demonstration of the results, answering questions from the teacher and other project teams, and submitting all deliverables (documents, papers, applications, etc.) as required.

Project evaluation (teacher evaluation, group leader evaluation, and peer evaluation). The teacher evaluates the self-learning process based on the project deliverables acceptance test results; the group leader evaluates the performance of internal members; and other members evaluate their group based on the group's defense presentation.

3.2.3 Summarize experience in a timely manner, analyse academic data, and innovate evaluation criteria

The application of project-based teaching methodology requires a clear evaluation criterion for a scientific and fair assessment of the project. It is important to review the overall implementation of the project, summarize experience and lessons learned, and use big data statistical analysis to assist students in identifying their strengths and challenges during project execution. By maintaining strengths and addressing challenges, students can establish their own learning process and standards, build practical skills for career development, and cultivate good self-learning habits. This, in turn, will drive personal comprehensive strength.

The overall goal is to evaluate each student's learning process, encourage their self-learning initiative, and cultivate their ability to collaborate, standardize their self-learning habits and methods, and promote the development of practical skills. This is of great significance for higher vocational colleges in cultivating application-oriented, innovative, and skilled talents and laying a solid foundation for their future social output.

4. Conclusion

Higher vocational colleges should combine their own development and characteristics to cultivate innovative, skilled, and applied talents for the society. In the online and offline integrated teaching process, they should strengthen teacher guidance, flip the classroom, implement the "from pre-class self-study to in-class deep learning guided by teachers" model. Based on scientific project management theories and methods, through project grouping, project approval, task decomposition, milestone establishment, project monitoring, project result acceptance, and project evaluation stages, they can complete the planning, organization, guidance, monitoring, and evaluation of the autonomous learning process, forming a systematic autonomous learning method for higher vocational colleges in the post-epidemic era. This method can enhance students' motivation for autonomous learning, strengthen teachers' control over the autonomous learning process in the integrated online and offline teaching environment, cultivate students' good autonomous learning habits and abilities, and provide a reference for students in similar colleges and universities to carry out autonomous learning.

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